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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# BEFORE THE BOARD OF PATENT APPEALS
## AND INTERFERENCES

Application Number: 10/568,173
Filing Date: February 10, 2006
Appellant(s): ALI, WALID

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Thomas E. Kocovsky, Jr.
For Appellant

## EXAMINER'S ANSWER

This is in response to the appeal brief filed 08/06/2010 appealing from the Office action

mailed 03/17/2010.

**(1) Real Party in Interest**

The examiner has no comment on the statement, or lack of statement, identifying

by name the real party in interest in the brief.

**(2) Related Appeals and Interferences**

The following are the related appeals, interferences, and judicial proceedings

known to the examiner which may be related to, directly affect or be directly affected by

or have a bearing on the Board's decision in the pending appeal:

US Application Number 10/571,809

**(3) Status of Claims**

Claims 1-16 are rejected and pending. The following is a list of the claims:

1. A device comprising:
    a controller:

    a memory coupled to the controller; and

    an input interface which receives at least two event signals,

    wherein the controller determines:

    a global correlation matrix for the at least two event signals over a first period of
    time,

    a local correlation matrix for the at least two event signals over a second period
    of time which is shorter than the first period of time,

    a correlation vector indicative of a deviation between the local correlation matrix
    and the global correlation matrix,

    an average of the correlation vector, and

    whether an artifact was detected in one of the at least two event signals from the
    correlation vector and the average of the correlation vector.

2. The device according to Claim 1 wherein said device is a patient monitoring system.

3. The device according to Claim 2 wherein said at least two event signals are
monitored patient data signals.

4. A patient monitoring system comprising:

    a controller;

    a memory coupled to the controller;

    an input interface configured to receive at least two event signals, the at least two
event signals being patient monitored data signals;

    wherein the controller determines whether an artifact is detected by:

        repeatedly determining a global correlation for the at least two event
signals over a first period of time,

        repeatedly determining a local correlation for the at least two event signals
over a second period of time which is shorter than the first period of time,

        repeatedly determining a current deviation between the local correlation
and the global correlation,

        determining an average deviation of a plurality of the current deviations,
and

        determining whether an artifact was detected in one of the at least two
event signals based on a difference between the current deviation and the
average deviation; and

        an alarm indicator coupled to the controller, the alarm indicator being
triggered if at least one of the event signals crosses a preset threshold value and
the controller determines that no artifact was detected in the at least one event
signal.

5. The device according to Claim 1 further comprising a memory for recording the at
least two event signals.

6. The device according to Claim 1, wherein said device includes a server forming part
of a client-server network.

7. A method for detecting a signal artifact in event signals, the method comprising the steps of:

receiving at least two event signals;

determining a global correlation for the at least two event signals over a first period of time;

determining a local correlation for the at least two event signals over a second period of time which is shorter than the first period of time;

repeatedly determining a current deviation between the local correlation and the global correlation;

determining an average deviation from a plurality of the determined current deviations;

comparing the current deviation and the average deviation to determine whether an artifact was detected in one of the at least two event signals; and

triggering an alarm indication in response to determining that an artifact was detected.

8. The method according to Claim 7 wherein said method is used with a patient monitoring system.

9. The method according to Claim 8 wherein said at least two event signals are monitored patient data signals.

10. The method according to Claim 9, said method further comprising the step of:

providing the alarm indication in response to at least one of the event signals crossing a preset threshold value.

11. The method according to Claim 7, said method further comprising the step of.

recording the at least two event signals.

12. The method according to Claim 7, wherein said method is used in a server forming part of a client-server network.

13. A system for detecting a signal artifact in an event signal, comprising:

means for receiving at least two event signals;

means for determining a global correlation for the at least two event signals over a first period of time;

means for determining a local correlation for the at least two event signals over a second period of time which is shorter than the first period of time;

means for determining a deviation between a local correlation vector and a global correlation vector;

means for determining an average deviation from the deviation; and

means for determining whether an artifact was detected in one of the at least two event signals based upon the average deviation.

14. The system according to Claim 13 wherein said system is a patient monitoring system.

15. The system according to Claim 14 wherein said at least two event signals are patient monitored data signals.

16. The system according to claim 13 further including:

means for monitoring at least one physiological parameter of a patient and generating the at least two event signals, said at least two event signals conveying patient physiological parameter data.

**(4) Status of Amendments After Final**

The examiner has no comment on the appellant's statement of the status of

amendments after final rejection contained in the brief.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter

contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

**NEW GROUND(S) OF REJECTION**

A new ground(s) of rejection is presented to clarify the 35 USC 102 rejection and

to illustrate that the motivation for the combination of the prior art references under 35

USC 103 arises from the references themselves.  No new art is presented.

**WITHDRAWN REJECTIONS**

The following grounds of rejection are not presented for review on appeal

because they have been withdrawn by the examiner.  Snyder et al. (US 6,287,328)

under 35 USC 102(b) presented 01/04/2008; the combination of Stadler et al. (US

6,397,100) under 35 USC 102(b) and Stadler et al. (US 6,397,100) in view of Snyder et

al. (US 6,287,328) under 35 USC 102(a) presented 06/02/2008; the combination of

Snyder et al. (US 6,287,328) under 35 USC 102(b) and 35 USC 102(a) presented

09/08/2008; and the combination of Snyder et al. (US 6,287,328) under 35 USC 102(b)

and 35 USC 102(a) presented 11/21/2008.

**(7) Claims Appendix**

The examiner has no comment on the copy of the appealed claims contained in

the Appendix to the appellant's brief.

**(8) Evidence Relied Upon**

| 5,661,813 | Shimauchi et al. | 08-1997 |
| 6,287,328 | Snyder et al. | 9-2001 |

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

### *Double Patenting*

The double patenting rejection over US application 10/597309 presented on

06/22/2009 has not been addressed by appellant during prosecution to date.

### *Claim Rejections - 35 USC § 102*

1.     The text of those sections of Title 35, U.S. Code not included in this action can

be found in a prior Office action.

2.     Claim(s) 1 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by

**Shimauchi et al. (US 5,661,813, herein Shimauchi)**.

Regarding **claim(s) 1 and 13,** Shimauchi discloses a device and system

comprising: a controller, *echo canceller* $22_m$; a memory coupled to the controller, *Sig*

*Storage and Vect Gen* $17_n$; and an input interface arranged to receive at least two event

signals, $11_1$, $11_2$, $11_n$, wherein the controller determines: a global correlation, for the at

least two event signal over a first period of time, *cross-correlation between previous*

*received signals*, a local correlation matrix, for the at least two event signals over a

second period of time which is shorter than the first period of time, *cross-correlation*

*between current received signals of different channels*, a correlation vector indicative of

a deviation between a local correlation vector and a global correlation vector, *the*

*extracted variation in the cross-correlation*, an average of the correlation vector,

*Normalized Least Mean Square algorithm*, and whether an artifact, *echo*, was detected

in one of the at least two event signals from the correlation vector and the average of

the correlation vector (Abstract, Fig. 6, Col. 2, ll. 9 – 37).


### Claim Rejections - 35 USC § 103

3.        The text of those sections of Title 35, U.S. Code not included in this action can

be found in a prior Office action.

4.        Claim(s) 2 – 6 and 14 – 16 are rejected under 35 U.S.C. 103(a) as being

unpatentable over **Shimauchi et al. (US 5,661,813, herein Shimauchi)** in view of

**Snyder et al. (US 6,287,328, herein Snyder) (cited previously)**.

         With regard to **claim(s) 2 and 14**, Shimauchi fails to disclose wherein said device

is a patient monitoring system.

         However, Snyder teaches wherein said device is a patient monitoring system

(Abstract).

5.        It would have been obvious for one of ordinary skill in the art at the time of the

invention to modify the patient monitoring system having multivariable artifact

assessment as disclosed by Snyder to utilize the artifact assessment techniques as

taught by Shimauchi since all of the claimed elements were disclosed in the prior art

and the combination would have yielded predictable results to one of ordinary skill at the

time of the invention. Furthermore, as appellant indicates in the specification that the

instant invention has broad application as a general purpose device (page 4, ll. 12 –

20), the prior art was not limited to medical technology.

Regarding **claim(s) 3 and 15,** Shimauchi in view of Snyder discloses wherein said at least two event signals are patient monitored data signals (Snyder: Col. 4, ll. 42 – 47).

With regard to **claim 4,** Shimauchi in view of Snyder discloses all of the limitations of claim 4 as discloses in claim 1 above and further discloses an alarm indicator coupled to the controller, the alarm indicator being triggered if at least one of the event signals crosses a preset threshold value and the controller determines that no artifact was detected in the at least one event signal (Snyder: Col. 7, ll. 55 – 63).

Regarding **claim 5,** Shimauchi in view of Snyder inherently discloses a memory for recording the at least two event signals (Snyder: Col. 4, ll. 24 – 41).

Regarding **claim 6,** Shimauchi in view of Snyder discloses wherein said device is a server forming part of a client-server network (Shimauchi: Col. 1, ll. 11 – 39).

With regard to **claim 16,** Shimauchi in view of Snyder discloses the method further including: means for monitoring at least one physiological parameter of a patient and generating the at least two event signals, *sensors*, said at least two event signals conveying patient physiological parameter data (Snyder: Abstract; Col. 4, ll. 42 – 47).

6.      Claim(s) 7 – 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Snyder et al. (US 6,287,328, herein Snyder)** in view of **Shimauchi et al. (US 5,661,813, herein Shimauchi)**.

Regarding **claim 7,** Snyder discloses a controller, *inference processor*; a memory coupled to the controller; and an input interface which receives at least two event signals, the at least two event signals being patient monitored data signals, *measurement system*; wherein the controller determines whether an artifact is detected

(Column 4, lines 24 – 41) and triggering an alarm indication in response determining

that an artifact was detected (Abstract).  Snyder fails to disclose the method of

determining artifact corruption as claimed in the instant application.

However, Shimauchi teaches determining artifact, *echo*, corruption by using: a

global correlation matrix for the at least two event signals over a first period of time,

*correlation between previously received signals,* a local correlation matrix for the at least

two event signals over a second period of time which is shorter than the first period of

time, *correlation between current received signals*, a correlation vector indicative of a

deviation between the local correlation matrix and the global correlation matrix, *a*

*variation in the cross-correlation,* an average of the correlation vector, *Normalized Least*

*Mean Square algorithm*, and whether an artifact, *echo*, was detected in one of the at

least two event signals from the correlation vector and the average, of the correlation

vector (Abstract, Fig. 6, Col. 2, ll. 9 – 37).

7.      It would have been obvious for one of ordinary skill in the art at the time of the

invention to modify the artifact assessment techniques as disclosed by Shimauchi for

detection of artifact in a patient monitoring system since all of the claimed elements

were disclosed in the prior art and the combination would have yielded predictable

results to one of ordinary skill at the time of the invention. Furthermore, as appellant

indicates in the specification that the instant invention has broad application as a

general purpose device (page 4, ll. 12 – 20), the prior art was not limited to medical

technology.

With regard to **claim 8,** Snyder in view of Shimauchi discloses wherein said device is a patient monitoring system (Snyder: Abstract).

Regarding **claim 9,** Snyder in view of Shimauchi discloses wherein said at least two event signals are patient monitored data signals (Snyder: Col. 4, II. 42 – 47).

Regarding **claim 10,** Snyder in view of Shimauchi discloses providing the alarm indication in response to at least one of the event signals crossing a preset threshold value and no artifact was detected in the at least one event signal (Snyder: Col. 7, II. 55 – 63).

With regard to **claim 11,** Snyder in view of Shimauchi inherently discloses a memory for recording the at least two event signals (Snyder: Col. 4, II. 24 – 41).

Regarding **claim 12,** Snyder in view of Shimauchi discloses wherein said method is used in a server forming part of a client-server network (Shimauchi: Col. 1, II. 11 – 39).

**(10) Response to Argument**

Regarding claim 1:

Appellant challenges whether or not $X_n(k)$ of Shimauchi is a matrix. Shimauchi utilizes standard vector and matrix notation when describing the signals used in the invention. In addition, the mathematical expressions for $x_1(k)$ and $x_2(k)$ in column 3, lines 10 – 14 of Shimauchi also describe transposed matrices.

Appellant argues that Shimauchi is not concerned with correlation of the signals of interest, $x_1(k)$ and $x_2(k)$. However, Shimauchi discloses in the abstract that the variation of the cross-correlation between current received signals of different channels is extracted which corresponds to the cross-correlation between previous received

signals, and the extracted variation is used as an adjustment vector.  The examiner is

taking the position that the "global correlation matrix" of appellant's invention is

equivalent to the "cross-correlation between previous received signals" specified in the

abstract of Shimauchi.

Further, appellant asserts that Shimauchi fails to disclose a local correlation

matrix, as claimed. The examiner is taking the position that the "local correlation matrix"

of appellant's invention is equivalent to the "cross-correlation between current received

signals of different channels" specified in the abstract of Shimauchi. As this matrix is a

"current" matrix, it has a temporal value less than that of the previously received matrix

equated to appellant's global correlation matrix.

Appellant also indicates that Shimauchi fails to disclose a controller to determine

a correlation vector indicative of deviation between the local correlation matrix and the

global correlation matrix.  To the contrary, the echo canceller 22m, in figure 6 of

Shimauchi, illustrates a cross-correlation variable extractor between the previously

received signal $e_m(k)$ and the current received signal $x(k)$ at 19m.  The previously

received signal and the current received signal are received at different times (see

above).

Appellant states that Shimauchi fails to determine an average of the correlation

vector.  Shimauchi clearly discloses the use of a Normalized Least Mean Squared

algorithm in column 2, lines 9 – 37 as an intermediate step involved in the removal of

the echo, or artifact, from the signal.

Finally, appellant argues that Shimauchi fails to disclose a determination of whether an artifact was detected in one of the at least two event signals from the correlation vector and an average of the correlation vector. Shimauchi provides this determination in the magnitude of the adjustment vector $v(k)$ in figure 6. The presence of an adjustment vector would indicate the presence of noise or artifact, while the lack of an adjustment vector would indicate the absence of noise or artifact.

Regarding claims 2 and 3:

Appellant argues that Snyder does not cure the shortcomings of Shimauchi and that the examiner has not asserted such a cure. To the contrary, the examiner indicated in the final rejection that Snyder's invention, a general purpose noise assessment device, had application in noise removal or cancellation and the combination of Shimauchi in view of Snyder would have yielded predictable results. The examiner relied on the disclosures of the prior art to provide motivation for the combination of the references in that both of the references were concerned with noise management (see above).

Regarding claim 3:

Appellant's arguments are directed to limitations that are further limiting than those found in the claim.

The examiner has equated echoes to noise and artifact. The invention of Shimauchi would be able to cancel echoes / noise / artifact given appropriate input signals such as those contemplated by Snyder.

Regarding claim 5:

The limitations of claim 1 are discussed above.

Appellant's arguments are directed to limitations that are further limiting than those found in the claim.

Regarding claim 6:

The limitations of claim 1 are discussed above.

Appellant's arguments are directed to limitations that are further limiting than those found in the claim.

Regarding claim 4:

The limitations addressed by the appellant with respect to claim 4 were addressed in the response to the arguments concerning claim 1 above with the exception of the alarm indicator limitation. The claim language is directed to an alarm indicator. The examiner is interpreting the output of the inference processor as an alarm indicator. Appellant's arguments are directed to limitations, i.e. triggering an alarm, that are further limiting than those found in the claim.

Regarding claims 7 – 12:

The limitations addressed by the appellant with respect to claim 7 were addressed in the response to the arguments concerning claim 1 above with the exception of the alarm indication limitation. The examiner is interpreting the output of the inference processor as an alarm indication. Appellant's arguments are directed to limitations, i.e. triggering an alarm, that are further limiting than those found in the claim.

In response to appellant's argument that the device of Shimauchi is not directed to removal of echo or other artifact from biological signals, a recitation of the intended

use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In the instant case, the examiner has equated echoes to noise and artifact. The invention of Shimauchi would be able to cancel echoes / noise / artifact given appropriate input signals such as those contemplated by Snyder.

Regarding claim 10:

Appellant argues that Snyder fails to disclose providing an alarm indication in response to of the biological function or activity signals crossing a preset threshold. The examiner is interpreting the output of the inference processor as an alarm indication.

Regarding claim 13:

The limitations addressed by the appellant with respect to claim 13 were addressed in the response to the arguments concerning claim 1 above.

Regarding claims 13 and 14:

In response to appellant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR*

*International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case,
noise, echo and artifact are considered synonymous terms generally available to one of
ordinary skill in the art, therefore any signal conditioning or analysis techniques
incorporating the limitations of appellants claimed invention would be applicable as prior
art.

Regarding claim 15:

Appellant's arguments are directed to limitations, e.g. echo cancellation, that are
further limiting than those found in the claim. Further, see above at claims 13 and 14 for
a discussion on the motivation for the combination of Shimauchi and Snyder.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the
Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section **(9)**
above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer
exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal**
as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the
primary examiner by filing a reply under 37 CFR 1.111 with or without amendment,
affidavit or other evidence. Any amendment, affidavit or other evidence must be
relevant to the new grounds of rejection. A request that complies with 37 CFR

41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

    (2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

    Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.


    Respectfully submitted,

    /Luther G Behringer/
    Examiner, Art Unit 3766


**A Technology Center Director or designee must personally approve the new ground(s) of rejection set forth in section (9) above by signing below:**

    /Angela D Sykes/

    Director, Technology Center 3762

Conferees:

/Carl H. Layno/

Supervisory Patent Examiner, Art Unit 3766


/LoAn H. Thanh/

Supervisory Patent Examiner, Art Unit 3764